BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

COLPAN

Serial No.: 08/796,040

Filed: February 5, 1997

Group Art Unit: 1623

Examiner: J. Crane

#36
AJ
7/23/99

For: DEVICE AND A PROCESS FOR THE ISOLATION OF NUCLEIC ACIDS

APPELLANT'S BRIEF

Appellant submits the present brief, in triplicate, subsequent to the Notice of Appeal filed September 30, 1998.

(1) REAL PARTY IN INTEREST

The real party in interest is Qiagen GmbH, a corporation of Germany, by virtue of an Assignment document recorded at Reel/Frame 7121/0455 in the United States Patent and Trademark Office.

(2) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences.

(3) STATUS OF CLAIMS

Claims 1-61 and 69 were canceled. In accordance with an Amendment Under 37 CFR §1.116 submitted, concurrently, herewith, claims appealed 62-68 and 70-81 are replaced by claims 101-119 (see §(4), *infra*). Claims 101-119 are found in Appendix I, *infra*.

Appealed claims 72, 73, 79, and 80 stood rejected under 35 U.S.C. §112, second paragraph. Appealed claim 79 stood rejected under 35 U.S.C. §112, first

paragraph, for allegedly lacking enablement. Appealed claims 62-68 and 81 stood rejected under 35 U.S.C. §103 for allegedly lacking patentability based on the combined teachings of U.S. 5,057,426 ("Henco") and U.S. 5,075,430 ("Little"). Applying the rejections of record to replacement claims 101-119 would effect (A) rejection of claims 110, 111, 117, and 118 under 35 U.S.C. §112, second paragraph, (B) rejection of claim 117 under 35 U.S.C. §112, first paragraph, and (C) rejection of claims 101-119 under 35 U.S.C. §103.

(4) STATUS OF AMENDMENTS

An amendment submitted March 31, 1999 (by facsimile) has not been entered. An Amendment is submitted concurrently, herewith, as mentioned above, in accordance with 37 CFR §1.116. The Amendment is submitted to correct inadvertent clerical errors appearing in the Amendment filed November 24, 1997 and the aforesaid amendment submitted March 31. 1999. A copy of the concurrently submitted Rule 116 Amendment appears as Appendix II, *infra*.

(5) SUMMARY OF INVENTION

The presently claimed invention provides a process for isolating and purifying nucleic acids found in cells, i.e., using the cells as the starting materials [page 1, lines 1-3]. The process involves two chromatographic purification (adsorbing-desorbing) stages, operated in tandem; whereby, purified nucleic-acid-containing material obtained in the first stage is applied to the second stage, directly, as it comes from the first stage.

In the first stage cells containing the nucleic acids to be isolated are digested, cell debris is removed, and the nucleic acids are adsorbed on anion-exchange material [page 5, lines 7-36] and, subsequently, desorbed from the anion-exchange material; adsorption of the nucleic acids being effected in the presence of a buffer solution [Abstract, lines 7-8] under conditions of lower salt concentration than the buffer solution enabling the nucleic acids to be desorbed from the anion-exchange material [page 6, 7-11].

In the second stage the nucleic-acids desorbed from the anion-exchange material, still in the higher-salt desorption buffer, are applied and adsorbed onto a mineral support [page 8, lines 1-4], followed by desorbing the nucleic acids from the mineral support using a buffer solution having a lower ionic strength than the buffer in which the nucleic acids were applied (to the mineral support) [Abstract, lines 17-19].

The combination of adjusting the ionic strength of adsorption and dessorption conditions with the adsorbing materials used in the two stages (i.e., anion-exchange material and mineral support) in accordance with the presently claimed process, allows the *desorbing* buffer in the first stage to act as the *adsorbing* buffer in the second sage. Preferably, the anion-exchange material is based on a support matrix (porous or non-porous) of surface-modified agarose, dextran, cellulose, acrylic amide, poly(vinyl alcohol), polystyrene, glass, aluminum oxide, titanium dioxide, zirconium dioxide, or, silica gel [page 5, lines 17-21 and 24-28; page 12, lines 19-24; original claim 13].

The anion-exchange material is preferably comprised of a porous or non-porous material [page 5, lines 24-28; original claim 14] having a particle size of 1-250 μm [page 5, lines 32-33; original claim 14]; more preferably the particle size is 10-30 μm [original claim 14].

Preferred support materials are silica gel, glass, zeolite, aluminum oxide, titanium dioxide, zirconium dioxide, kaolin, diatomacae, or silica glass [page 12, lines 29-32].

Preferably, each of the stages includes a "conditioning" step (i.e., between the adsorbing and desorbing steps), in order to optimize yields [page 6, lines 23-26]. A particularly preferred conditioning solution used in the second stage (i.e., applied to the mineral support between adsorbing and desorbing steps) corresponds to an ionic strength of about 1.5 M sodium perchlorate at a pH of approximately 5 [page 6, lines 30-33].

The presently claimed process provides unique advantages for the purification of nucleic acids in the recited tandem *order* of using the "anion-exchange material" and "mineral support, that is, the exchange material, first, followed by the mineral support. Certain impurities, while being adsorbed to, and eluted from, the anion-exchange material along with the nucleic acids are incapable of adsorbing to the downstream mineral support under the same ionic conditions under which eluting from the anion-exchange material occurred. In other words, the buffer of higher ionic strength used to elute nucleic acids from the anion-exchange material not only allows for adsorption

of the eluted nucleic acids to the mineral support; it does not provide conditions for adsorbing the impurities to the mineral support [page 9, lines 3-10].

(6) ISSUES

The issues presented on appeal are: A) whether claims 110, 111, 117, and 118 (representing appealed claims 72, 73, 79, and 80) contain indefinite claim language under 35 U.S.C. §112, second paragraph; (B) whether claim 117 lacks enablement under 35 U.S.C. §112, first paragraph; and (C) whether claims 101-119 (representing appealed claims 62-68 and 70-81) would have been obvious under 35 U.S.C. §103 based on the combined teachings of Henco and Little.

(7) GROUPING OF CLAIMS

The claims do not stand or fall together. Claims limited to particular matrices (110 and 111 [representing appealed claims 72 and 73]) are independently patentable.

(8) ARGUMENT

A. Claims 101, 111, 117, and 118 do not contain indefinite claim language under 35 U.S.C. §112, second paragraph.

Claims 101 and 111 do not contain the term "includes," which was the basis for the rejection (corresponding appealed claims 72 and 73 were amended to change "includes" to --has--).

Use of "includes" in claim 117 (corresponding to appealed claim 79) is not indefinite. The claim recites the "solution *includes*" certain components. The statement of rejection sets forth that "includes" is used to define a "compound"

(Office action mailed 3/31/98, page 2). Appearance of "comprises" in claim 117 is not indefinite; it is used for its approved purpose. The § 112, 2nd paragraph, rejection of the terms "includes" and "comprises" for allegedly creating improper claim breadth (i.e., "failure to further define the implied missing components") is unsupported by any reference to a statute, rule, regulation, or controlling case law. Applicant is free to be his own lexicographer. *In re Castaing*, 166 USPQ 550 (CCPA 1970). *In re Zletz*, 13 USPQ2d 1320 (Fed. Cir. 1989). It is the applicant's prerogative to define the claims, not the examiner's. *In re Pilkington*, 162 USPQ 145 (CCPA 1969). Furthermore, the allegation would not support a rejection for indefinite claim language (§ 112, 2nd paragraph) even if it were true; claim "breadth is not to be equated with indefiniteness." *In re Miller*, 169 USPQ 597 (CCPA 1970). Applicant respectfully submits that these terms are used appropriately in the context of the instant claims.

B. Claim 117 does not lack enablement under 35 U.S.C. §112, first paragraph.

Claim 117 does not recite "mixture, thereof," the basis of the rejection (the term was deleted from corresponding appealed claim 79).

C. Claims 101-119 would not have been obvious under 35 U.S.C. §103 based on the combined teachings of Henco and Little.

The rejection under §103 for alleged obviousness is based on the combined teachings of Henco and Little. The statement of rejection uses essentially

the same arguments found in the rejections made in the parent application; except that the Hagen and Sternberg references are not cited to support the instant rejection.

The process according to the instant claims saliently differs from Henco in that steps c) and d) of claim 101 are neither taught nor suggested. Henco contains no motivation to modify the process disclosed in therein by the steps c) and d) of present claim 101. No hint is given in Henco that (i) an increase in salt concentration should be effected in the sample fraction, nor is there any hint that (ii) such a fraction should be subsequently treated by application to a mineral support material in order to bind thereto the nucleic acid contained in the fraction, nor is there any hint to (iii) subsequently elute the substrate-bound nucleic acids using a buffer having very low ionic strength.

Little provides no teaching or suggestion to supply the salient deficiencies in Henco. Almost the same distinction with Henco applies with regard to the distinguishing Little from the presently claimed process. Applicant could not find any passage in the whole disclosure of Little that nucleic acids, ***which have already been separated,*** should be subjected to a treatment according to the process of Little. Therefore, there is indeed no motivation to combine the two documents, either in modifying Little according to Henco or in modifying Henco according to Little; or that any motivation is provided in the art to look to Henco or Little as suggested by the Examiner.

Applicant respectfully submits that the combination of Henco and Little is overly simplistic. Again, Henco discloses purification of nucleic acids by an anion exchange treatment or an anion exchange separation process. The key features are binding the nucleic acid at low ionic strength and eluting the nucleic acids at concentrations in the range of 2 M salt in the buffer (the number can be derived from Fig. 4 of the specification of Henco). No use of any chaotropic salt is disclosed in Henco.

On the other hand, Little binds nucleic acids from a solution having a very high content of salts, especially chaotropic salts.

The skilled artisan would not have had any incentive to even increase the "high" salt concentration obtained after henco's process after reading Little's disclosure. The Examiner, himself, points out that Henco teaches desalting the sample obtained after the last step of the claim 1 of Henco (however, desalting is optional - "if desired" - not needed as stated by the Examiner). Optional desalting in Henco by the procedures disclosed therein is not disputed.

Appellant does dispute, however, that the skilled artisan would have been motivated to rely on Little's process in order to "desalt" Henco's sample. According to Henco, if desired, the skilled artisan would, regardless of the circumstance, try to reduce the salt content; either by applying a salt concentration, as low as possible, in the eluting step or by trying to desalt the sample by well known conservative methods, such as dialysis or gel permeation chromatography.

By no means however, would the skilled artisan ever consider, as opposed to getting rid of the salt, actually *increasing* after elution the salt content of the sample in Henco's process in order to obtain a sample having a very, very high salt concentration, as required in Little. The fact that, in accordance with the presently claimed invention, there is performed the step of increasing the salt content after Henco's process, in order to be able to employ process steps as disclosed in Little, may be regarded as a key unexpected step of steps as disclosed in the present invention.

Appellant respectfully submits that (on page 5 of the Office action mailed March 31, 1998) the Examiner mistakenly points out that Henco claim 8 would already anticipate the filtration step of the instant claims by saying that "mechanical procedures" would be used. However, in this context, the mechanical procedures used are for disrupting the cells; for example, a French press treatment or a mechanical disruption of the cell by tissue grinding.

The Examiner maintains (Office action mailed June 24, 1997) that Little contains motivation to substitute the three desalting methods used in Henco (column 7, lines 44 to 46) with the silica separation method according to Little. Appellant respectfully disagrees.

Henco **starts** with DNA having a relatively low concentration of salt, which is not comparable with the situation Little address in the introductory portion of his

disclosure. The DNA fractions dealt with in the paragraph cited by the Examiner are obtained after a cesium chloride gradient centrifugation.

With respect to the samples which would be obtained in "too high a dilution," appellant submits that Henco teaches a method for separating DNA, wherein the DNA is not highly diluted in the eluate obtained from the method.

Since the DNA is first absorbed on the chromatographic matrix and is afterwards desorbed in one elution step, the concentration of DNA is considerably high in the feral eluate. By analogy, therefore, Little's separation would be considered by the skilled person as an alternative *separation* method for isolating DNA; not as a mere substitute desalting step.

In contrast, the method of the presently claimed invention utilizes, for the first time, the *effect* of silica disclosed in Little for such desalting steps. Originally, Little was not at all dealing with a desalting method, but with a separation method starting with highly concentrated salt solutions. This is evident from column 2, line 17 et seq. of Little, were it is stated: "This invention is directed to a process for the *purification* of plasmid and other DNA, both single-stranded and double-stranded, by immobilizing the DNA onto diatomaceous earth particles and eluting the DNA with water or low salt buffer (emphasis added)."

Therefore, the skilled artisan would not consider the Little reference for just employing a desalting step of a sample obtained according to Henco. Applicant respectfully submits that the argument of the Examiner is a matter of hindsight;

picking out features of the claimed process and trying to find the features in some piece of prior art. With all due respect, the argument for obviousness fails to consider the question: Why would the skilled person have believed that Little would be a suitable "desalting step" in a method according to Henco? Applicant emphasizes that the inventive objective of the present claimed invention was to show that Little's purification process could also be used for desalting of a DNA-containing fraction. However, Little is not concerned in any way with desalting of a sample. Little is concerned with purification of DNA found in a high-salt solution. Henco, however, does not yield such a sample having nucleic acid in a high salt environment.

Applicant respectfully submits the statement of rejection takes out of context certain statements made in Little; which distorts what is, actually, described and disclosed by the reference. That is, Little states "the invention is directed generally to the immobilization of DNA onto diatomaceous earth which comprises contacting the DNA with the diatomaceous earth in the presence of a chaotropic agent" (Little column 2, lines 32-35). Similar statements are made, elsewhere, in the reference. The statement of rejection characterizes these references in a manner that makes it *appear* as if Little encompasses (that is, *contemplated*) using *isolated* DNA as a *starting material*.

On the contrary, Little was concerned with the *desire* "to rapidly and inexpensively *separate* and purify DNA that was also amenable to scale-up" (Little column 1, lines 66-67). Little contemplated purifying DNA from "bacterial lysates"

(Little column 1, lines 11-12); "plasmid DNA *from mini-prep lysates* can be purified using the process of the present invention" (Little column 5, lines 43-44), "this example illustrates that DNA can be purified *from bacterial lysates* independently of the method used to prepare the DNA and *without prior phenol extraction to remove proteins*" (Little, example 1) "the isolation of supercoiled DNA *from an agarose gel* by binding onto diatomaceous earth" (Little example 4), "nucleoside from triphosphates *are effectively removed from radiolabeling reactions* by the process of the present invention" (Little example 5), "the removal of linkers *from cloning reactions* using the process of the present invention" (Little example 6). Accordingly, Little contemplated, and described, a process that would address the problem whereby the "purification of plasmid DNA from bacterial lysates is a rate-limiting and time-consuming step in molecular biology" (Little column 1, lines 11-13), and fulfilled the objective whereby "a method was still desired *to rapidly and inexpensively* separate and purify DNA that was also amenable to scale-up" (Little column 1, lines 66-68).

As a result, the desirability (that is, motivation) provided by Little was to develop a process for isolated and purifying DNA that was more *rapid* than known methods. This motivation would not have led one of ordinary skill in the art to combine Little with Henco since it would not have sped up the process of either Little or Henco, at all; in fact, it would have increased the time over and above that needed to perform either the Henco process or the Little process. If there were any

motivation, it would have been to *replace* the Henco method, entirely, with the Little method; which, also, would have effected the optional *desalting* step taught by Henco.

With all due respect, the rejection uses impermissible *hindsight*; that is, by selectively picking and choosing from Little's teachings in a manner that fails to appreciate Little, as a whole.

Furthermore, the suggested combination would destroy the invention upon which Little was based; that is, for example, a *one*-step procedure to save time. A reference cannot be used (under § 103) to show obviousness in a manner that destroys the invention on which the reference is based. *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984).

CONCLUSION

For the foregoing reasons, reversal of all appealed rejections of record is requested.

Respectfully submitted,

By: 
William E. Player
Reg. No. 31,409

JACOBSON, PRICE, HOLMAN & STERN, PLLC
400 Seventh Street, N.W.
The Jenifer Building
Washington, D.C. 20004
Tel.: (202) 638-6666
Atty. Dkt. No.: 10496/P58126US1
WEP:id

S:\HOME\CBROWN\JULY\P58126U1.BR2

APPENDIX I

CLAIMS

101. A process for the isolation and purification of nucleic acids from cells comprising, in two separation/purification stages, the steps of:

i) in a first separation/purification stage,

a) digesting the cells containing nucleic acids, removing cell debris and thereafter subjecting the nucleic acids to anion exchange against an anion exchanger in a first buffer solution, which has a low ionic strength,

b) desorbing the nucleic acids from the anion exchanger by applying a second buffer solution, which has a higher ionic strength than the first buffer solution, effecting purified nucleic acids in the second buffer solution; and

ii) in a second separation/purification stage,

c) adsorbing the separation/purified nucleic acids in the second buffer solution onto the surface of a mineral support material, optionally in the presence of lower alcohols, poly(ethylene glycol), or a mixture thereof, and

d) desorbing the nucleic acids from the mineral support material by applying an eluant, wherein the eluant is water or a third buffer solution,

which has an ionic strength lower than the second buffer solution, effecting twice-purified nucleic acids.

102. The process according to claim 101, wherein the stages i) and ii) are carried out in immediate succession.

103. The process according to claim 101, further comprising the step of, prior to the digesting step, subjecting the cells to centrifugation or filtration in order to remove undissolved components.

104. The process according to claim 101 further comprising, between the steps a) and b), one or more washing steps by applying a fourth buffer solution, which has a low ionic strength, optionally increasing ionic strength per washing step.

105. The process according to claim 101 further comprising, between the steps c) and d), one or more washing steps by applying a fifth buffer solution, which has an ionic strength higher than the first buffer solution.

106. The process according to claim 101 further comprising, between the steps c) and d), at least one washing step by applying an aqueous alcoholic solution.

107. The process according to claim 101 further comprising, between the steps c) and d), a washing step by applying a solution having an ionic strength corresponding to a 1.5 molar sodium perchlorate solution and a pH of 5.

108. The process according to claim 101, wherein the isolated and purified nucleic acid has from 10 nucleotides to 200,000 nucleotides.

109. The process according to claim 101, wherein the mineral support material is silica gel, glass, zeolite, aluminum oxide, titanium dioxide, zirconium dioxide, kaolin, or diatomacae.

110. The process according to claim 101, wherein the anion exchanger has a porous or non-porous matrix having a particle size of from 1 to 250 μm.

111. The process according to claim 101, wherein the anion exchanger has a porous or non-porous matrix having a particle size of from 10 to 30 μm.

112. The process according to claim 101, wherein the mineral support is silica gel, in suspension, having a particle size of from 1 to 250 μm.

113. The process according to claim 101, wherein the mineral support is silica gel, in suspension, having a particle size of from 1 to 5 μm.

114. The process according to claim 101, wherein the anion exchanger has a particle size of from 1 to 250 μm and a pore diameter of from 1 to 2,500 nm.

115. The process according to claim 101, wherein the anion exchanger has a particle size of from 10 to 100 μm and a pore diameter of from 1 to 2,500 nm.

116. The process according to claim 101, wherein the anion exchanger has a particle size of from 1 to 250 μm and a pore diameter of from 100 to 400 nm.

117. The process of claim 106, wherein the aqueous alcoholic solution includes from 1 to 7 M sodium perchlorate, from 1 to 7 M guanidine-HCl, from 1 to 5 M sodium chloride, from 1 to 6 M sodium iodide, and 1 M sodium chloride in 20% ethanol, propanol, isopropanol, butanol, poly(ethylene glycol), or mixture thereof.

118. The process of claim 101, wherein the eluant is a buffer solution that comprises water and Tris at a pH value of from 5 to 9.

119. The process of claim 101, whereby the nucleic acids are plasmid or genomic DNA.

APPENDIX II

BOX AF
RESPONSE UNDER 37 CFR 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 1623

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: Metin COLPAN

Serial No.: 08/796,040 Group Art Unit: 1623

Filed: February 5, 1997 Examiner: J. Crane

COPY

Title: DEVICE AND A PROCESS FOR THE ISOLATION OF NUCLEIC ACIDS

SECOND AMENDMENT SUBMITTED UNDER 37 CFR 1.16

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Applicant submits the instant Amendment in conjunction with the Appeal Brief, filed concurrently herewith, to correct inadvertent clerical occurring in the Amendments filed November 24, 1997, and March 31, 1999.

IN THE CLAIMS

Please cancel claims 62-68 and 70-100, and substitute therefore the following claims 101-119.

101. A process for the isolation and purification of nucleic acids from cells comprising, in two separation/purification stages, the steps of:

i) in a first separation/purification stage,

a) digesting the cells containing nucleic acids, removing cell debris and thereafter subjecting the nucleic acids to anion exchange against an anion exchanger in a first buffer solution, which has a low ionic strength,

b) desorbing the nucleic acids from the anion exchanger by applying a second buffer solution, which has a higher ionic strength than the first buffer solution, effecting purified nucleic acids in the second buffer solution; and

ii) in a second separation/purification stage,

c) adsorbing the separation/purified nucleic acids in the second buffer solution onto the surface of a mineral support material, optionally in the presence of lower alcohols, poly(ethylene glycol), or a mixture thereof, and

d) desorbing the nucleic acids from the mineral support material by applying an eluant, wherein the eluant is water or a third buffer solution, which has an ionic strength lower than the second buffer solution, effecting twice-purified nucleic acids.

102. The process according to claim 101, wherein the stages i) and ii) are carried out in immediate succession.

103. The process according to claim 101, further comprising the step of, prior to the digesting step, subjecting the cells to centrifugation or filtration in order to remove undissolved components.

104. The process according to claim 101 further comprising, between the steps a) and b), one or more washing steps by applying a fourth buffer solution, which has a low ionic strength, optionally increasing ionic strength per washing step.

105. The process according to claim 101 further comprising, between the steps c) and d), one or more washing steps by applying a fifth buffer solution, which has an ionic strength higher than the first buffer solution.

106. The process according to claim 101 further comprising, between the steps c) and d), at least one washing step by applying an aqueous alcoholic solution.

107. The process according to claim 101 further comprising, between the steps c) and d), a washing step by applying a solution having an ionic strength corresponding to a 1.5 molar sodium perchlorate solution and a pH of 5.

108. The process according to claim 101, wherein the isolated and purified nucleic acid has from 10 nucleotides to 200,000 nucleotides.

109. The process according to claim 101, wherein the mineral support material is silica gel, glass, zeolite, aluminum oxide, titanium dioxide, zirconium dioxide, kaolin, or diatomacae.

110. The process according to claim 101, wherein the anion exchanger has a porous or non-porous matrix having a particle size of from 1 to 250 μm.

111. The process according to claim 101, wherein the anion exchanger has a porous or non-porous matrix having a particle size of from 10 to 30 μm.

112. The process according to claim 101, wherein the mineral support is silica gel, in suspension, having a particle size of from 1 to 250 μm.

113. The process according to claim 101, wherein the mineral support is silica gel, in suspension, having a particle size of from 1 to 5 μm.

114. The process according to claim 101, wherein the anion exchanger has a particle size of from 1 to 250 μm and a pore diameter of from 1 to 2,500 nm.

115. The process according to claim 101, wherein the anion exchanger has a particle size of from 10 to 100 μm and a pore diameter of from 1 to 2,500 nm.

116. The process according to claim 101, wherein the anion exchanger has a particle size of from 1 to 250 μm and a pore diameter of from 100 to 400 nm.

117. The process of claim 106, wherein the aqueous alcoholic solution includes from 1 to 7 M sodium perchlorate, from 1 to 7 M guanidine-HCl, from 1 to 5 M sodium chloride, from 1 to 6 M sodium iodide, and 1 M sodium chloride in 20% ethanol, propanol, isopropanol, butanol, poly(ethylene glycol), or mixture thereof.

118. The process of claim 101, wherein the eluant is a buffer solution that comprises water and Tris at a pH value of from 5 to 9.

119. The process of claim 101, whereby the nucleic acids are plasmid or genomic DNA.

REMARKS

The claims presented are 101-119.

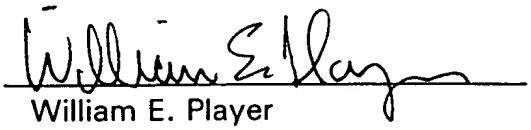
New claims 101-118 correspond to appealed claims 62-68 and 70-80, submitted in the preliminary amendment filed with the instant application, as amended by the amendment filed November 24, 1997. The new claims are submitted to correct the inadvertent clerical errors mentioned, above. In the amendment submitted November 24, 1997, claim 64 as originally filed was rewritten as claim "63," which rendered incorrect the numbering of subsequently rewritten claims. The amendment submitted March 31, 1999, was filed to correct the incorrect claim numbering; but, inadvertent errors resulted in the wrong claims being identified as claims 93-97. Because of the complicated nature of the errors, and entire new set of claims is presented, hereby.

The undersigned sincerely regrets any inconvenience caused the examiner and the USPTO by the aforesaid inadvertent errors.

Favorable action commensurate with the foregoing is requested.

Respectfully submitted,

JACOBSON, PRICE, HOLMAN & STERN, PLLC

By: 
William E. Player
Reg. No. 31,409

The Jenifer Building
400 Seventh Street, NW
Washington, D.C. 20004-2201
Telephone: (202) 638-6666
Atty. Docket: P58126US1
Date: July 1, 1999
WEP/id

S:\HOME\CBROWN\JULY\P58126U1.amd